

## **REMARKS**

### **Pending Claims:**

In this application, claims 1 and 2 are currently pending and are amended by this Response. New claims 3 and 4 are added. Entry of these amendments is respectfully requested.

### **Rejection under 35 U.S.C. §112 (Second Paragraph)**

In the Office Action, claim 2 was rejected under 35 U.S.C. §112, second paragraph. Claim 2 is amended to replace “said grouted material” with “said grout formation” which has antecedent basis in step d).

### **Art Rejections**

The Examiner has rejected claim 1 as being anticipated by or obvious in light of Abe et al, U.S. Patent No. 4,116,012. Claims 1 and 2 are rejected as being obvious in light of a combination of Abe and Newton, U.S. Pat. No. 1,599,142.

The Abe patent describes a method that uses at least one of two special additives to its cement mixture: a hardening agent (col. 2, lines 27-30) and/or an expansion agent (col. 2, lines 6-9). The Applicant’s method of forming a pile in semi-stable soil beneath very unstable soil, by introducing grout material under controlled pressure, does not require the use of these specialized additives and claims 1 and 2 specifically recite the absence of these additives. The expansion agent additive is necessary to the Abe method since the firm contact between the cement containing material and the existing soil is what provides the load bearing capacity of the Abe piles. In a second embodiment, the hardening agent additive 20, added to solidifying material 19, is used to prevent the solidifying material 19 from entering the pile casing. If the solidifying material 19 entered the pile casing instead of the void at the end of the pile casing, the pressure of the expanding material would be reduced, thereby preventing the pile from achieving the required load bearing capacity. Nevertheless, these additives are problematic. The appropriate amount of the additives will vary greatly depending on environmental factors like temperature and water content of the existing materials, thus making it difficult to predictably produce the desired consistency. Failure to use the

proper amount of additive will yield an unstable, insecure or failing pile. Thus, significant advantage in the reliable quality of the resulting pile is achieved by eliminating the need for these additives and claim 1 is thereby patentably distinguishable over Abe.

Further, Abe describes the use of a specialized auger 11 to remove soil from the area to be filled with the cement material (with additive(s)). This specialized auger 11 is equipped with folding vanes 16 at the bottom end of the auger. The Abe arrangement requires a close tolerance between the auger and the inside wall of the pile casing 13. This close tolerance is required to clean the inside of the pile casing and to prevent the cement mixture (with additive(s)) from migrating into the pile casing. Thus, to practice the Abe method, a different size auger is required for different sizes of pile casings. Investment in augers of a range of sizes would be relatively costly. Standard augers will not suffice since the auger used in the Abe method requires the folding vanes 16 to provide a void in the soil materials at the bottom of the auger and pile casing. It is into this void that Abe's cement material (with additive(s)) is introduced.

In the Applicant's method recited in new claims 3 and 4, there is no removal or excavation of soil materials. Rather, the semi-stable soil is consolidated by the grout material that is introduced under pressure to the soil region. Thus, no specialized auger or soil removal device is employed by the Applicant's method and this makes the Applicant's method significantly more convenient and less costly than the Abe method.

The Examiner has applied a combination of Abe and Newton in a rejection of claim 2. The Applicant respectfully submits that in light of the discussion above with regard to the Abe requirements (additives and specialized auger equipment) that Abe combined with Newton does not yield the claimed method. In fact, the Newton method has similar inadequacies to the Abe method. For example, Newton involves driving a wooden pile through a casing in place using a driving ram. This driving ram requires a closed tolerance between the outside diameter of the rma and the inside walls of the initial casing. A different size driving ram is required for each small variation in pile diameter. As with Abe, this requirement of size-specific equipment results in a relatively expensive system for the user. Further, as with Abe, Newton does not show or teach that the changing of an existing soil condition, as is provided by Applicant's method of introducing grout material under pressure.

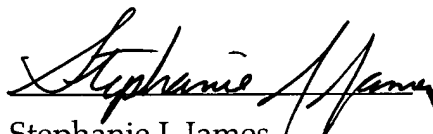
The Applicant's method yields many advantages over the prior art. Because no augering or pile driving equipment is used, the method can be employed in situation where there is very little head room, such as five to six feet. Abe's auger and Newton's driver both require head room to accommodate the augering or driving equipment above the length of the casing. Further, the Applicant's method requires no size-specific equipment and therefore can be used economically to make piles of a range of sizes. Still further, Applicant's method can be used to provide relatively small diameter piles, e.g. 4-6 inches in diameter, as well as larger piles.

### CONCLUSION

All of the claims remaining in this application should now be seen to be in condition for allowance. The prompt issuance of a notice to that effect is solicited.

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